mass was assessed at autopsy after PROG PACE and REC and in NORMAL dogs. Ventricular ANP was assessed by sensitive and specific immunohistochemical staining for ANP 1–28.

	NORMAL	PROG PACE	REC
LVEDd (mm)	39 ± 2	50 ± 1*†	49 ± 1*†
EF (%)	49 ± 5	21 ± 3*†	37 ± 2*†
PCWP (mmHg)	2.3 ± 0.6	21.5 ± 3.8*	7.5 ± 0.9*#
CO (L/min)	3.13 ± 0.18	1.47 ± 0.23*	3.58 ± 0.34 #
LV mass (g/kg)	4.6 ± 0.3	5.4 ± 0.3 †	5.5 ± 0.2*†
ANP (pg/mL)	46 ± 8	181 ± 59*	68 ± 15

* = $p < 0.05$ vs NORMAL; † = $p < 0.05$ vs pre-RVP; # = $p < 0.05$ vs PROG PACE

Immunohistochemistry was markedly positive for ANP in ventricular myocardium in both PROG PACE and REC dogs. Immunostaining of NORMAL ventricular myocardium was negative. These studies confirm that circulating ANP more closely parallels changes in cardiac filling pressures as compared to cardiac dilatation and/or ventricular hypertrophy. In contrast, local ventricular ANP emerges as a sensitive local tissue marker for ventricular hypertrophy and dilatation in this novel model of heart failure and ventricular remodeling.

05:15

727-6 In Vivo Noninvasive Assessment of Left Ventricular Function in Transgenic Mice with Phospholamban Deficiency and Over-expression

Saeb F. Khoury, Evangelia G. Kranias, Nancy Ball, Richard A. Walsh, Brian D. Hoit. *University of Cincinnati, Cincinnati, OH*

Recent data suggest that phospholamban (PLB) modulates basal and beta agonist-stimulated myocardial contractility in the isolated heart. To determine the physiological role of PLB *in vivo*, anesthetized wild type mice (WT, n = 5) and transgenic mice with PLB gene targeted ablation (PLB-KO, n = 4) and overexpression (PLB-DEF, n = 5) were studied with 2D-guided M-mode and Doppler echo using a 9 MHz imaging and 5–7.5 MHz Doppler transducer (Interspec CX 200). Data were acquired in the baseline state (BASE) and after isoproterenol (ISO) injection (1 μg/mg i.p.). Shortening fraction (SF) was calculated from M-mode. The peak early transmitral (Ev) and aortic (Aov) velocities and ejection times were measured using Doppler and the heart rate-corrected velocity of circumferential shortening (Vcf_c) was calculated.

	CON		PLB-DEF		PLB-OE	
	BASE	ISO	BASE	ISO	BASE	ISO
HR (bpm)	282 ± 49	349 ± 55*	322 ± 143	424 ± 43	217 ± 34	355 ± 51*
SF (%)	41 ± 3	64 ± 3*	46 ± 4	62 ± 3*	41 ± 4	65 ± 4*
Vcf_c (circ/s)	10 ± 3	22 ± 3*	18 ± 7	27 ± 7	7 ± 1#	20 ± 4*
Ev (cm/s)	40 ± 12	50 ± 3	82 ± 10†	89 ± 16†	44 ± 9#	62 ± 10*#
Aov (cm/s)	65 ± 4	75 ± 17	109 ± 15†	108 ± 7†	68 ± 6#	89 ± 7*

mean ± SD; *p < 0.05 vs BASE; † p < 0.05 vs CON, # vs DEF, ANOVA

We conclude: 1) Phospholamban regulates basal left ventricular function *in vivo* and modulates the sensitivity to β adrenergic stimulation; 2) Assessment of left ventricular function under varying physiological conditions in mice can be performed noninvasively.

728 Non-Invasive Angiography by MR and CT

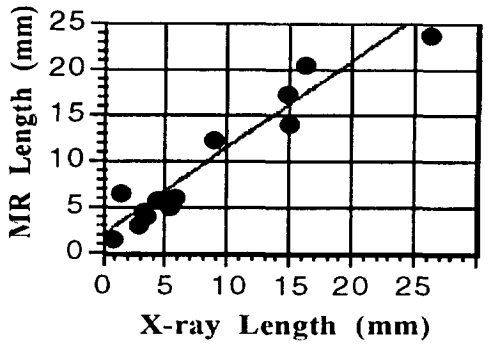
Monday, March 20, 1995, 4:00 p.m.–5:30 p.m.
Ernest N. Morial Convention Center, Room 21

04:00

728-1 Determination of Stenosis Length by Magnetic Resonance Coronary Angiography

Walter J. Rogers, Christopher M. Kramer, Therese M. Theobald, Nathaniel Reichek. *Medical College of Pennsylvania, Allegheny General Hospital, Pittsburgh, PA*

Magnetic resonance coronary angiography (MRA) can identify significant stenoses (>50%) as regions with reduced signal intensity due to disturbed intraluminal flow. To determine whether MRA stenosis length reflects true lesion length by x-ray angiography (XA), 12 patients (10 male and 2 female; age 65 ± 8 years) underwent both MRA and XA with an average of 2.1 ± 1.7 days between procedures. MRA was performed with the patient prone on an elliptical spine coil using a fat suppressed, TurboFlash, breath hold, segmented k-space sequence during late diastole. MRA defects were quantified off-line by manual tracing of digital images. XA stenoses were analyzed from 35 mm cine films using an electronic caliper which reported defect length, stenosis diameter and area. Matched MRA-XA stenoses included 5 in the left anterior descending (LAD), 8 right coronary artery (RCA) and 2 left circumflex (LCX). MRA and XA results were highly correlated (r = 0.96). MRA reported a slightly longer stenoses length 9.65 ± 2.0 mm versus 8.32 ± 2.1 mm for XA ($p < 0.05$ paired t-test). The ratio (MRA stenosis length/XA stenosis length) was not dependent on stenosis severity, absolute stenosis lumen diameter or area (MANOVA). Thus, in addition to detecting the presence of coronary lesions, MRA allows quantification of stenosis length.



04:15

728-2 Current Limitations of Two-Dimensional Breath-Hold Magnetic Resonance Coronary Angiography

Albert C. van Rossum, Johannes C. Post, Mark B.M. Hofman, Jaap Valk, Cees A. Visser. *Free University Hospital, Amsterdam, The Netherlands; Interuniversity Cardiology Institute of the Netherlands, Utrecht, The Netherlands*

Purpose: Two-dimensional k-space segmented breath-hold magnetic resonance angiography (2D-MRA) was recently reported to be a sensitive and specific technique for the detection of proximal coronary artery (CA) stenoses. We investigated its accuracy in pts referred for X-ray contrast coronary angiography (X-CCA) and report on encountered current limitations. *Methods:* 20 Pts (17 male; mean age 57 years) referred for X-CCA because of angina pectoris underwent a 2D-MRA study of the proximal major epicardial CA's (RCA, LMCA, LAD, LCx). X-CCA demonstrated normal CA's in 5 pts. In 15 pts 7 proximal stenoses of 50–70% (4 RCA, 1 LMCA, 1 LAD, 1 LCx), 11 of 70–90% (4 RCA, 4 LAD, 3 LCx), and 4 >90% (1 LMCA, 3 LAD) were demonstrated. 1 Mm overlapping images of transverse and oblique orientations were obtained at 1.5 Tesla, using a surface coil, with pts in prone position. A k-space segmented gradient echo acquisition (TE 8 ms, TR 16.4 ms) with fat-suppression was used. Slice thickness was 4 mm and in-plane resolution 1.2 × 2.4 mm^2. Images were evaluated by 2 experienced physicians in consensus for: 1. Identification of major epicardial CA's, 2. Recognition of side branches and 3. Presence of stenoses. *Results:* 1. All proximal segments could be positively identified by 2D-MRA. 2. Identified were segments from 20 out of 31 proximal RCA side branches (65%), 16 out of 30 LAD diagonal branches (53%) and 1 of 18 LCx obtuse marginal branches (6%). 3. Of 22 significant stenoses (>50%) on X-CCA, only 2 (1 RCA 70–90% and 1 LAD >90%) were 'surely' demonstrated; 7 stenoses were 'possibly' present (1 RCA 50–70%, 2 RCA 70–90%, 1 LM 50–70%, 1 LM >90%, 2 LAD 70–90%) and 13 stenoses were judged 'not' to be identified. *Conclusions:* 2D-MRA is capable of correctly identifying proximal CA's and segments of 47% of its side branches, but in its current state has a low sensitivity (41%, including 'possible' identifications) for the detection of significant CA stenoses.

04:30

728-3 Contrast-enhanced Electron Beam Tomography for 3-D Reconstruction of Coronary Arteries: Detection of Stenoses and Documentation of Angioplasty Success

Werner E. Moshage, Stephan Achenbach, Bernd Seese, Kurt Bachmann, Gudrun Hach, Markus Kirchgeorg. *Medical Clinic II (Cardiology), University of Erlangen-Nürnberg, Germany*

Non-invasive imaging of coronary arteries is complicated by their very fast movements. We evaluated the potential of contrast-enhanced Electron Beam Tomography (EBT, Ultrafast-CT) for the visualization of coronary artery stenoses.

24 patients with angiographically documented coronary artery disease were investigated. In 5 patients, EBT was repeated after angioplasty. Contrast agent was administered via a peripheral vein and ECG-triggered axial EBT scans were obtained during breathhold (acquisition time 100 ms/slice, table movement 2 mm/slice, slice thickness 3 mm). 3-D reconstruction of the coronary arteries was performed as shaded surface display with a density